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Comparative outcomes of blunt and penetrating diaphragmatic ruptures: A single trauma center study

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ABSTRACT

Objective: Diaphragma rupture is an insidious case following thoracoabdominal trauma with significant morbidity and mortality rates, if left untreated. Its symptoms might be masked by other associated injuries, which are often present, especially following blunt trauma. Modern imaging modalities might overlook a present diaphragmatic rupture. The real challenge, therefore, lies in diagnosis rather than treatment. To shed more light on this entity, we shared our experience in this regard.

Material and Methods: A total of 51 patients were enrolled in the study between January, 2008 and October, 2023, with a diagnosis of diaphragma rupture. Two groups were created, namely patients with blunt trauma (PwBT) and patients with penetrating trauma (PwPT). They were evaluated in terms of demographics, clinical and laboratory findings, trauma associated variables, mechanism of injury, accompanying injuries, imaging results, operative approaches and mortality rates.

Results: Mean age was 26 (22-33). 21.6% of the patients had blunt trauma. PwBT had significantly more extraabdominal site injuries and additional abdominal organ injuries ($p< 0.05$). Glasgow coma scale and calculated revised trauma score values were significantly lower and injury severity scores values were significantly higher in PwBT ($p< 0.05$). Significant thorax trauma accompanied 81.8% of PwBT and 40% of PwPT. Mortality was observed in 11.8% of the patients, with hemodynamic instability being the leading cause of death.

Conclusion: A trauma surgeon must exercise great caution not to overlook a diaphragma rupture following, especially, blunt thoracoabdominal trauma since it is both a consequence and reason of significantly increased mortality and morbidity rates. Future studies should focus on various aspects of both diagnosis and management of this entity, such as increasing the preoperative diagnosis accuracy and requirement of mesh usage during defect closure and optimal approach to especially right sided penetrating thoracoabdominal injuries.

Keywords: Thoracoabdominal trauma, diaphragma rupture, intrathoracic visceral herniation

INTRODUCTION

Diaphragmatic rupture (DR) following thoraco-abdominal trauma is both rare and insidious. DR occurs in less than 6% of patients with blunt thoraco-abdominal trauma and is often considered a marker of severe injury (1). It is frequently accompanied by additional abdominal organ injuries (AAOI), which usually prompt surgical evaluation. Consequently, DR may be overlooked at the time of admission, even with modern critical care and emergency protocols (2,3). In contrast, diaphragmatic injuries resulting from penetrating trauma are typically diagnosed via diagnostic laparoscopy, as recommended by current guidelines (4).

Until three decades ago, most patients with blunt abdominal trauma, suspected solid organ injuries, or a significant number of penetrating abdominal injuries underwent laparotomy (5,6). However, the modern approach to blunt abdominal trauma has shifted from emergency surgery to non-operative management, which has also contributed to DRs being overlooked, as they are often identified during surgical procedures (7). Unfortunately, missing a diagnosis of DR in both penetrating and blunt injuries can lead to significant morbidity and mortality, with reported mortality rates nearing 30%, particularly in cases involving hernia incarceration (8).

As a result, trauma surgeons must exercise great caution when evaluating patients with thoraco-abdominal trauma and interpreting their radiological images. Even advanced imaging techniques, such as computed tomography (CT), may initially fail to detect a DR (9). It is crucial for surgeons to be familiar with this life-threatening and potentially subtle clinical condition to prevent mortality. This study was therefore conducted to compare the clinical presentations of penetrating and

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blunt diaphragmatic injuries and to provide insights on the appropriate management of these trauma patients.

MATERIAL and METHODS

A total of 51 patients, admitted to our emergency department with either blunt or penetrating thoraco-abdominal trauma, and diagnosed with DR either upon admission or during surgery between January 2008 and October 2023, were enrolled in this study. Patient data were recorded daily, and a retrospective analysis was conducted specifically for this research. Ethics approval was obtained from our hospital's ethics committee (23.11.2023-B.10.1.TKH.4.34.H.GP.0.01/447).

The study participants were divided into two groups: Patients with blunt trauma (PwBT) and patients with penetrating trauma (PwPT). Data collected included demographics, mechanism of injury (MOI), presence of AAOIs and extra-abdominal site injuries (EASI), types of surgical procedures, mortality rates and causes, injury severity scores (ISS), calculated revised trauma scores (cRTS), Glasgow coma scales (GCS), hemoglobin (Hb) and white blood cell (WBC) counts, systolic blood pressure (SBP) and pulse rates, presence of pneumothorax, hemothorax, or hemopneumothorax, and the need for thoracotomy or tube thoracostomy. Radiological findings were also evaluated, including the percentage of preoperative diagnoses made using CT, diaphragmatic defect sizes, mesh applications during surgery, length of stay (LoS) in the intensive care unit (ICU), total hospital stay (THS), and the need for erythrocyte suspension (ES) transfusions.

Statistical Analysis

Statistical analysis was performed using SPSS software version 28.0 (IBM Corp, Released 2021. IBM SPSS Statistics for Windows, Version 28.0, Armonk, NY: IBM Corp). The distribution of variables was first assessed using the Kolmogorov-Smirnov test. Independent quantitative data were analyzed using unpaired t-tests, Kruskal-Wallis tests, ANOVA, and Mann-Whitney U tests, while dependent qualitative data were analyzed using the McNemar test. For independent qualitative data, Chi-square and Fisher's exact tests were employed. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 51 patients diagnosed with DR due to either blunt or penetrating thoraco-abdominal trauma were included in the study. Of these, 21.6% developed DR as a result of blunt trauma. Among 990 emergency admissions for blunt thoraco-abdominal trauma, 11 patients (1.1%) were diagnosed with DR. In comparison, out of 108 surgically evaluated cases of thoraco-abdominal stab wounds, 40 patients (37.1%) were found to have DR. Majority of the patients were males (96.1%) (Table 1),

Table 1. Demographics, trauma related pathologies, characteristics and interventions, follow-up characteristics

	Trauma			
Variables	**PwBT (n= 11)**	**PwPT (n= 40)**	**Total (n= 51)**	**p**
Age (year)	24.0 (20.0-32.2)	26.0 (22.5-32.5)	26 (22-33)	0.491
Male (%)	10 (90.9%)	39 (97.5)	49 (96.1%)	0.904
CT evaluation at admission (%)	3 (42.9%)	19 (47.5%)	22 (46.8%)	0.551
Additional abdominal organ injury (n)				**<0.001**
0	2 (18.2%)	34 (85.0%)	36 (70.6%)	
1	5 (45.5%)	2 (5.0%)	7 (13.7%)	
2	3 (27.3%)	4 (10.0%)	7 (13.7%)	
3	1 (9.1%)	0 (0.0%)	1 (2.0%)	
Extraabdominal site injury (n)				**<0.001**
0	1 (9.1%)	24 (60.0%)	39 (76.5%)	
1	5 (45.5%)	16 (40.0%)	7 (13.7%)	
2	3 (27.3%)	0 (0.0%)	3 (5.9%)	
3	2 (18.2%)	0 (0.0%)	2 (3.9%)	
Tube thoracostomy (%)	9 (81.8%)	16 (40.0%)	25 (49.0%)	**0.034**
Defect size (cm)	8.0 (7.0-11.0)	2.0 (1.0-2.0)	2.0 (1.5-4.8)	**<0.001**
ICU stay (day)	3.0 (1.0-11.0)	0.0 (0.0-0.0)	0.0 (0.0-1.0)	**<0.001**
Total hospital stay (day)	4.0 (1.5-14.0)	4.0 (3.0-7.0)	4.0 (3.0-7.5)	0.917
Surgery at admission or during follow-up (%)	10 (90.9%)	40 (100.0%)	50 (98.0%)	0.485
Mortality (%)	5 (45.5%)	1 (2.5%)	6 (11.8%)	**0.001**

Data are presented as median (IQR) or n (%).
PwBT: Patients with blunt trauma, PwPT: Patients with penetrating trauma, CT: Computed tomography, ICU: Intensive care unit.

Table 2. Mechanism of injury in blunt trauma patients	
In-vehicle traffic accident	6 (54.5%)
Motorcycle accident	2 (18.2%)
Crush injury	2 (18.2%)
Bicycle accident	1 (9.1%)

and mean age was 26 years (22-33). No statistical differences were observed between the groups regarding these factors (p> 0.05).

In terms of MOI, the penetrating trauma group (PwPT) consisted solely of stab wounds. On the other hand, PwBT was comprised of six patients (63.6%) injured in vehicle traffic accidents, 2 (18.2%) in motorcycle accidents (MA), 2 (18.2%) due to crush injuries, and 1 (9.1%) from a bicycle accident (Table 2). Overall, 22 patients (46.8%) underwent CT evaluation before surgery. In PwPT, CT scans were primarily used to rule out concomitant injuries rather than to diagnose DR, and no patients in this group received a DR diagnosis at admission based on CT. However, CT was diagnostic for DR in three patients (27.3%) in the PwBT group, while another patient's findings were suspicious for left diaphragm elevation (Figures 1-3). DR was ultimately diagnosed in seven patients (63.6%) during surgery, which was performed for other life-threatening thoracoabdominal injuries in this group.

The majority of DR cases involved the left side in both groups (81.8% in Group 1 and 82.5% in Group 2). EASIs were observed in 10 patients (90.9%) in the PwBT group, with 6 (54.5%) having pelvic and extremity fractures, 4 (36.4%) with thoracic trauma, 3 (27.3%) with spinal trauma, 3 (27.3%) with cranial trauma, and 1 (9.1%) with maxillofacial injury (Table 3). In PwPT, 40.0% of patients had EASIs, all of which were thoracic injuries. The average number of EASIs was significantly higher in PwBT (p< 0.05). AAOIs were observed in 15 patients (29.4%), with PwBT having significantly more AAOIs (p< 0.05) (Table 4).

Mean Hb at admission was 14.2 g/dL (12.7-15.2), with the lowest mean Hb value during follow-up being 12.1 g/dL (8.2-12.9) (Table 5). Hb levels at admission were similar between the groups (p> 0.05); however, the lowest Hb values in PwBT were significantly lower than those in PwPT (p< 0.05). Mean WBC count at admission was 12.700/µL (8.730-16.250), with significantly higher WBC counts in PwBT (p< 0.05). Mean pulse rate and SBP at admission were 90 bpm (82.0-100.0) and 102 mmHg (88.0-110.0), respectively. SBP was similar between the groups (p> 0.05), but pulse rates were significantly higher in PwBT (p< 0.05).

Mean GCS, cRTS and ISS values at admission were 15.0 (13.0-15.0), 7.55 (7.84-6.81), and 14.0 (8.0-23.5), respectively. PwBT had significantly lower GCS and cRTS values and significantly higher ISS values (p< 0.05). Pneumothorax, hemothorax, and hemopneumothorax were observed in 6 (54.5%), 2 (18.2%), and 1

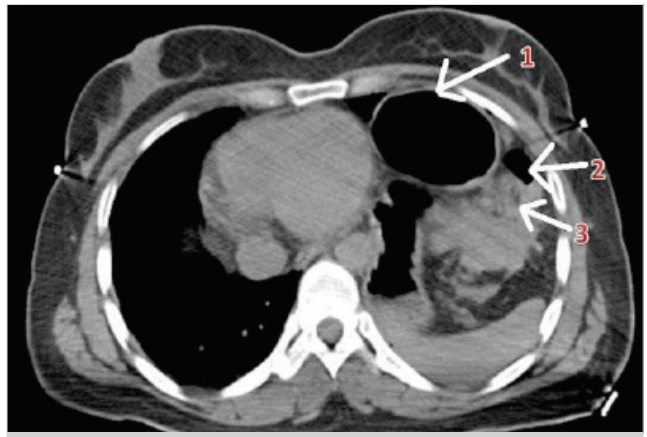

Figure 1. A 45-year-old female patient with left diaphragmatic stomach, colon and small bowel herniation following an in-vehicle traffic accident.

1: Stomach, 2: Colon, 3: Small bowel.

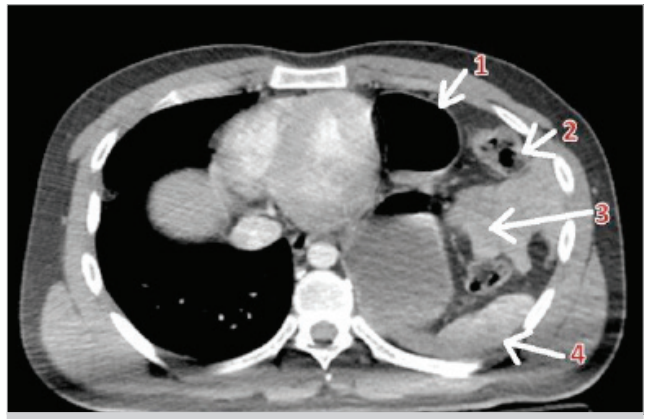

Figure 2. A 24-year-old male patient with left diaphragmatic stomach, colon, small boweland spleen herniation following an in-vehicle traffic accident.

1: Stomach, 2: Colon, 3: Small bowel, 4: Spleen.

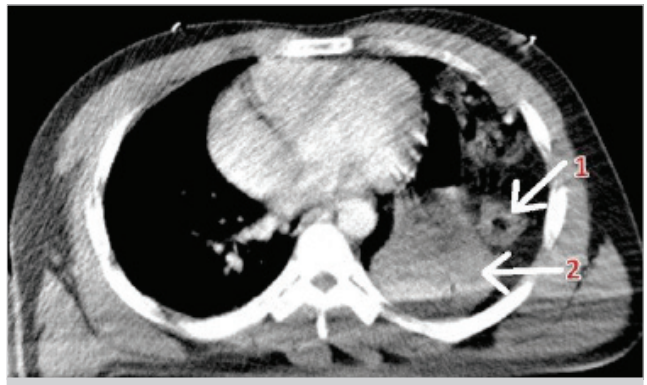

Figure 3. A 22-year-old male patient with left diaphragmatic stomach and colon herniation following an in-vehicle traffic accident.

1: Colon, 2: Stomach.

Table 3. Extra-abdominal site ınjury in blunt trauma patients	
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Pelvic and extremity fractures	6 (54.5%)
Thorax trauma	4 (36.4%)
Spinal trauma	3 (27.3%)
Cranial trauma	3 (27.3%)
Maxillofacial injury	1 (9.1%)

(9.1%) patients, respectively, in PwBT. In contrast, PwPT had 10 cases (25%) of hemopneumothorax and six cases (15%) of pneumothorax.

In the PwBT group, laparotomy was the most common surgical approach (72.7%), followed by thoracotomy (18.2%) and a combined approach (9.1%). In PwPT, 31 patients (77.5%) underwent laparoscopy, while nine patients (22.5%) required laparotomy. One PwPT patient had a missed diagnosis and was operated on six months after the initial injury. The average diaphragmatic defect size was 2.0 cm (1.5-4.8 cm), with significantly larger defects observed in PwBT ($p< 0.05$). Mesh repair was performed in two patients (3.8%), one from each group. All other defects were repaired primarily with non-absorbable sutures (98.1%). Tube thoracostomy was ultimately performed in 25 patients (49.0%), with PwBT having a significantly higher requirement for tube thoracostomy ($p< 0.05$).

Additional abdominal procedures (AAPs) were performed in seven patients (63.6%) in PwBT, including one case (9.1%) each of liver packing, hepatic vein ligation, right hemicolectomy, left hemicolectomy, small bowel resection and anastomosis, bladder repair, and orchiectomy. Similarly, seven AAPs were performed in PwPT, including two primary colon repairs (5.0%), two splenectomies (5.0%), one partial small bowel resection (2.5%), one primary small bowel repair (2.5%), and one distal pancreatectomy (2.5%).

Median ES transfusion requirement was 0.0 units (0.0-4.0), with significantly higher ES transfusion needs in PwBT ($p< 0.05$). The average THS and LoS in the ICU were 4.0 days (3.0-7.5) and 0.0 days (0.0-1.0), respectively, with PwBT showing a significantly longer ICU stay ($p< 0.05$). The overall mortality rate was 11.8%, with PwBT having significantly higher mortality ($p< 0.05$). Of the deaths, 83.3% were attributed to hemodynamic instability while the remaining 16.7% were due to severe head trauma.

Table 4. Additional abdominal organ injury			
	PwBT (n)	**PwPT (n)**	**Total (n)**
Liver	4 (18.2%)	1 (4.5%)	5 (22.7%)
Kidney	4 (18.2%)	0	4 (18.2%)
Small bowel	2 (9.1%)	2 (9.1%)	4 (18.2%)
Colon	2 (9.1%)	2 (9.1%)	4 (18.2%)
Spleen	0	4 (18.2%)	4 (18.2%)
Bladder	1 (4.5%)	0	1 (4.5%)
PwBT: Patients with blunt trauma, PwPT: Patients with penetrating trauma.			

Table 5. Clinical and laboratory findings along with trauma related scores				
	Trauma			
Variables	**PwBT (n= 11)**	**PwPT (n= 40)**	**Total (n= 51)**	**p**
Hemoglobin at admission (g/dL)	13.5 (10.7-14.8)	14.2 (12.9-15.4)	14.2 (12.7-15.2)	0.287
Minimum hemoglobin during follow-up (g/dL)	8.5 (7.1-10.2)	12.4 (9.5-13.0)	12.1 (8.2-12.9)	**0.002**
Leukocyte (10^3/µl) at admission	21300 (12850-23730)	11300 (8567-14050)	12700 (8730-16250)	**0.005**
Pulse at admission	110.0 (97.5-135.0)	89.0 (80.0-95.2)	90.0 (82.0-100.0)	**<0.001**
Systolic blood pressure (mmHg) at admission	110.0 (80.0-120.0)	101.0 (91.0-110.0)	102.0 (88.0-110.0)	0.628
GCS at admission	11.0 (7.0-15.0)	15.0 (14.0-15.0)	15.0 (13.0-15.0)	**0.014**
cRTS at admission	5.96 (4.61-7.47)	7.84 (7.18-7.84)	7.55 (7.84-6.81)	**<0.001**
ISS at admission	41.0 (31.5-45.5)	9.0 (6.0-15.2)	14.0 (8.0 to 23.5)	**<0.001**
ES transfusion (unit)	4.0 (2.0-8.0)	0.0 (0.0-2.0)	0.0 (0.0-4.0)	**<0.001**
Data are presented as median (IQR) or n (%) PwBT: Patients with blunt trauma, PwPT: Patients with penetrating trauma, GCS: Glasgow coma scale, cRTS: Calculated revised trauma score, ISS: Injury severity score, ES: Erythrocyte suspension.				

DISCUSSION

DR is a serious condition associated with significant morbidity and mortality if left untreated. Although many cases require only a straightforward defect closure using either non-absorbable separate or continuous sutures, diagnosing DR, especially following blunt trauma, poses a significant challenge for trauma surgeons. Not only can the symptoms be vague initially, but they are often overshadowed by more severe injuries. These vague symptoms can easily be masked by life-threatening conditions in blunt trauma patients, such as hemodynamically altering solid organ bleeding, signs of peritoneal irritation, or severe consciousness impairment due to head trauma. Additionally, even in the absence of peritoneal irritation, DR can be overlooked in PwPT. Given these challenges, trauma surgeons must exercise great caution and maintain a high degree of vigilance to avoid missing a DR diagnosis and its associated symptoms when evaluating patients with thoraco-abdominal trauma.

Our study group predominantly consisted of young male adults, a demographic pattern that aligns with current scientific evidence (10). The prevalence of DR observed in our study is also consistent with existing literature although some studies report higher rates of DR following blunt trauma (11,12). We believe that the inconsistency in these reports can be attributed to varying levels of clinical vigilance among centers and the time period during which the respective studies were conducted. With the advent of newer imaging modalities capable of better detecting occult DRs, it is possible that some centers may have previously overlooked a significant percentage of cases.

It is also plausible that we may have underestimated the incidence of DR in our study. Our actual numbers could be higher if we had applied the same level of clinical suspicion and vigilance during the earlier stages of data collection. On the other hand, the strict adherence to a laparoscopic evaluation protocol for penetrating injuries in our center resulted in favorable diagnostic outcomes. The literature indicates that the rate of missed diagnoses is less than 5% when patients undergo laparoscopic evaluation following penetrating thoracoabdominal trauma (13). Moreover, regarding the ratio of blunt to penetrating DR, geographical differences play a role in outcomes. Developing countries report up to three times more penetrating incidents compared to blunt trauma, which is consistent with our findings (14).

In our study, traffic accidents were the leading cause of blunt trauma-related DR, while stab wounds were the primary cause of penetrating trauma-related DR. These findings are consistent with the majority of contemporary studies (13,15). However, we believe that a more detailed discussion of the underlying mechanisms is warranted.

Blunt trauma to the thoracoabdominal region can cause DR through several mechanisms: shearing forces on a stretched diaphragm, muscular avulsion, burst-like rupture due to increased intra-abdominal pressure exceeding the diaphragm's capacity, or devitalization of a portion of the diaphragm, leading to delayed rupture (16). On the right side, the liver often absorbs some of the impact, making right-sided DR less common. When it does occur, it is usually associated with more severe trauma (17). For penetrating injuries, most cases result from violent assaults. Since the majority of assailants are right-handed, these injuries tend to affect the left side of the diaphragm (18). The distribution of DR based on location in both trauma groups in our study aligns with the patterns reported in the literature.

CT is the preferred imaging modality for evaluating patients with blunt thoracoabdominal trauma, provided they are hemodynamically stable (4,19). Given the severity of injuries that these patients may present with, it is unsurprising that nearly a quarter of our study group required emergency surgery without prior CT evaluation. The literature reports a detection rate of up to 70% for DR following blunt trauma using CT (4). However, our detection rates were significantly lower.

This discrepancy can be attributed to two primary factors. First, during the study period, improvements were made to our imaging equipment. Second, most patients were admitted to the emergency department during night shifts, when it was particularly challenging to obtain the expertise of a radiology specialist. While any physician can diagnose a large herniation into the thorax, the difficulty lies in recognizing more subtle signs, such as diaphragm discontinuity, the dangling diaphragm sign, diaphragm thickening, or the collar sign (20). A detailed review of each radiological sign is beyond the scope of this study.

The majority of PwBT presented with multiple accompanying injuries, either as EASI or AAOI. A significant percentage had associated thoracic trauma, and in cases of penetrating DR, thoracic injuries were the sole EASI. The literature similarly indicates that patients with DR following blunt trauma are often multitrauma patients, with the diagnosis of DR frequently made incidentally during surgery for another life-threatening injury (9). Stab wounds, in contrast, can easily damage both solid organs, such as the lungs and spleen, as well as the bowels, especially when multiple stab wounds are involved (21). Blunt trauma patients, on the other hand, frequently present with extremity fractures, thoracic injuries, and severe cranial trauma, all of which contribute to increased mortality and morbidity (22,23). In our study, AAOIs and EASIs were present in up to 90% of PwBT, highlighting the severity of the trauma. This high rate of associated injuries explains the increased complication rates, prolonged hospital stays, and the need for additional surgical interventions, such as thoracostomy tube placement.

Elevated WBC count at admission and the decrease in Hb levels in PwBT over time are expected findings, given the trauma setting and associated injuries. The average ES transfusion requirement in this group correlates with the severity of their injuries. GCS, cRTS and ISS findings further underscore the severity of trauma, as a significant portion of these patients presented to the emergency department with varying degrees of consciousness impairment. In the context of blunt DR, these findings align with existing literature (21). Stab wounds, on the other hand, typically result in less severe clinical outcomes compared to blunt trauma in the presence of a DR (24). Therefore, the observed statistical differences in these variables are both expected and consistent with the literature.

The literature suggests that the majority of DR cases following blunt thoracoabdominal trauma are treated via laparotomy, often followed by thoracotomy or a combined approach, as observed in our study (25). Some authors report high diagnostic and therapeutic success rates with laparoscopy (12). Given that hemodynamic instability typically necessitates emergent laparotomy, we anticipate that future studies will focus more on the role of laparoscopy in the evaluation of DR in less severe blunt thoracoabdominal trauma cases. In PwPT who are hemodynamically stable, diagnostic laparoscopy should be performed within 24 hours, regardless of the injury site. Contemporary evidence indicates significant rates of life-threatening DR even on the right side, making timely diagnosis critical (26,27).

Average defect sizes observed in our study are consistent with those reported in the literature. DR defect sizes following blunt trauma typically range from 5 cm to 15 cm while defects following penetrating injuries are generally smaller, often less than 5 cm (15,28). Currently, there is no strong evidence supporting or opposing the use of mesh during defect closure (12). In our study, two defect repairs were performed using polypropylene mesh, a decision based on the surgeon's preference and limited scientific evidence. We believe that future studies will offer further insight into the role of mesh in DR repair.

Mortality rates for all traumatic DRs range between 25% and 45%, with blunt trauma-associated DRs linked to higher mortality rates due to the severity of associated organ injuries (4,23). The mortality rate observed in PwBT in our study aligns with this literature while the mortality rate in PwPT was lower than what has been previously reported. We attribute this discrepancy to the inclusion of gunshot wounds in other studies, which we recognize as a major limitation of our study.

In addition to the previously mentioned limitation, this study has two other significant limitations. First, it has a retrospective design. Although much of the available trauma evidence in the literature comes from retrospective studies, certain issues-such as the need for mesh during diaphragmatic defect closure or the role of laparoscopy in evaluating the diaphragm after blunt trauma when radiological findings are inconclusive-may benefit from a prospective approach. Second, the size of our study group is modest. However, given the rarity of this clinical condition, any objective data contributed to the scientific literature are invaluable. We are pleased to have been able to add meaningful findings to the existing body of knowledge.

CONCLUSION

Traumatic DRs following blunt thoracoabdominal trauma are dangerous and insidious conditions, with high mortality and morbidity rates if left untreated. Even a slight clinical or radiological suspicion should prompt surgical evaluation. Future research should focus on factors contributing to increased mortality, improving preoperative diagnostic methods, the necessity of mesh during defect closure, and the role of early laparoscopic or thoracoscopic evaluation in hemodynamically stable patients with blunt DR.

Penetrating DRs, while generally less severe, are associated with excellent outcomes when managed appropriately. However, the optimal management strategies, including the use of thoracoscopy and the approach to right-sided penetrating injuries, remain areas of ongoing debate.

Ethics Committee Approval: This study was approved by İstanbul Health Sciences University, Ümraniye Training and Research Hospital Clinical Researches Ethics Committee (Decision no: B.10.1.TKH.4.34.H.GP.0.01/447 Date: 23.11.2023).

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ORİJİNAL ÇALIŞMA-ÖZET
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Künt ve penetran diyafragma rüptürlerinin karşılaştırmalı sonuçları: Tek bir travma merkezi çalışması

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ÖZET

Giriş ve Amaç: Diyafram yaralanması torakoabdominal travmalarda sessiz seyredebilen ve tedavi edilmezse yüksek morbidite ve mortalite ile seyreden bir klinik tablodur. Özellikle künt travmayı takiben eşlik eden ek yaralanmalar tarafından semptomları baskılanabilir. Modern görüntüleme yöntemleri mevcut diyafram yaralanmasını atlayabilmektedirler. Bu nedenle asıl zorluk bu klinik tabloyu tedaviden ziyade tanı aşamasında oluşmaktadır. Bu klinik tabloya daha fazla açıklık getirebilmek amacı ile bu hususstaki tecrübemizi paylaştık.

Gereç ve Yöntemler: Ocak 2008 ve Ekim 2023 tarihleri arasında diyafram yaralanması tanısı almış toplam 51 hasta çalışmaya dahil edildi. Künt ve penetran yaralanma olmak üzere iki grup oluşturuldu. Hastalar demografik veriler, klinik ve laboratuvar bulguları, travma ilişkili skorlar, yaralanma mekanizmaları, görüntüleme sonuçları, eşlik eden yaralanmalar, cerrahi yaklaşımlar ve mortalite oranları yönünden değerlendirildi.

Bulgular: Ortalama yaş 26 (22-33) idi. Hastaların %21,6'sı künt travma grubundaydı. Ekstraabdominal yaralanmalar ve ek abdominal organ yaralanmaları birinci grupta istatistiksel olarak anlamlı yüksek bulundu ($p< 0,05$). Birinci grupta ortalama Glasgow koma skalası ve hesaplanmış revize travma skorları anlamlı düşük bulunurken ortalama travma şiddet skoru anlamlı yüksek bulundu ($p< 0,05$). Ciddi toraks travması birinci gruptaki hastaların %81,8'inde, ikinci gruptaki hastaların %40'ında mevcut idi. Hastaların %11,8'inde mortalite gözlendi ve en önemli ölüm sebebi hemodinamik instabilite olarak bulundu.

Sonuç: Bir travma cerrahı özellikle künt torakoabdominal travmalı bir hastayı değerlendirirken diyafram yaralanmasını atlamamak için dikkatli olmalıdır. Zira bu durum travma hastalarında önemli derecede artmış mortalite ve morbidite oranlarının hem sonucu hem de sebebidir. Gelecek çalışmalar ameliyat öncesi tanısal doğruluğun arttırılması, defekt kapatılmasında yama kullanılması, özellikle sağ taraflı penetran yaralanmalarda optimal yaklaşımın oluşturulması gibi bu klinik tabloların çeşitli yönlerini araştırmalıdır.

Anahtar Kelimeler: Torakoabdominal travma, diyafragma rüptürü, intratorasik visseral

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